

Abstract Submitted
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An Experimental Study of Molecular Mixing Enhancement in a Small Shear Layer Facility¹ ROHIT NEHE, MANOOCHHEHR KOOCHESFAHANI, Michigan State University — An experimental investigation is carried out to characterize the mixing field in a very low Reynolds number forced shear flow where the flow velocity is so low that, without the imposed perturbation, there is little mixing due to the absence of turbulence. To enhance the mixing interfacial area, we provide flow perturbation over a range of frequencies and amplitudes. The chemically reacting LIF technique is used to quantify the level of mixedness, while single component MTV is employed to measure the amplitude of perturbation velocity. Results from streamwise LIF measurements show the existence of a limited range of perturbation frequencies that result in a high level of mixedness. The highest mixing cases also exhibit high levels of velocity fluctuation. The 3D nature of the mixing field is studied in more detail by performing spanwise LIF measurements. Results will be presented for the cross-stream structure of the mixing field over the cross section of the test facility.

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